

Exam. Code : 206702

Subject Code: 3521

M.Sc. (Computer Science) Semester-II

THEORY OF COMPUTATION

Paper-MCS-201

Time Allowed—3 Hours]

[Maximum Marks—100

Note :—(1) Attempt any FIVE questions.

(2) Students can use only Non-programmable and Non-storage type calculator.

1. Design Turing Machine that transforms a unary string into its binary representation. 20
2. Discuss the all Closure properties of language classes in detail. 20
3. (a) Differentiate the Chomsky Normal Form (CNF) and Greibach Normal Form (GNF). 5
(b) Construct Grammar in Greibach Normal Form equivalent to Grammar :
$$E \rightarrow E+T|T, T \rightarrow T*F|F, F \rightarrow (E)|a, \quad 15$$
4. (a) What do you mean by PDA and construct PDA accepting all Palindromes over input {a, b} ? 10

- (b) Design PDA to recognize the following language :
- (i) $L = \{a^{2n} b^n \mid n \geq 1\}$ 5
 - (ii) $L = \{a^n b^{2n} \mid n \geq 1\}$ 5
5. (a) Design DFA over input $\{a, b\}$ in which second and second last symbol should be same. 10
- (b) Discuss the Algebraic properties of Cellular Automata. 10
6. (a) Discuss the Ambiguity and the Formal Power series. 7
- (b) Differentiate the LL(k) and LR(k) Grammars with their properties. 7
- (c) Differentiate PDA and DFA. 6
7. (a) What do you mean by DFA and Design DFA that recognize the following Language ?
 $L = \{w : n_a(w) = 2, n_b(w) > 2, w \in \{a, b\}^*\}$ 15
- (b) Explain the Context Sensitive Language. 5
8. (a) Construct a DFA with reduced states equivalence to the Regular expression :
 $10(0+11)^0*1$ 10
- (b) Design a DFA for accepting strings over $\Sigma = \{0, 1\}^*$ not starting but ending with 01. 10